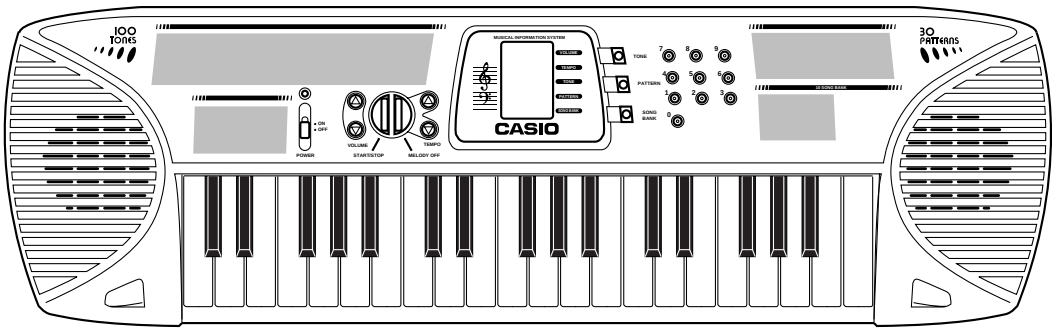
CASIO®

Service Manual

(without price)

SA-65



SA-65

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ELECTRONIC KEYBOARD

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SPECIFICATIONS

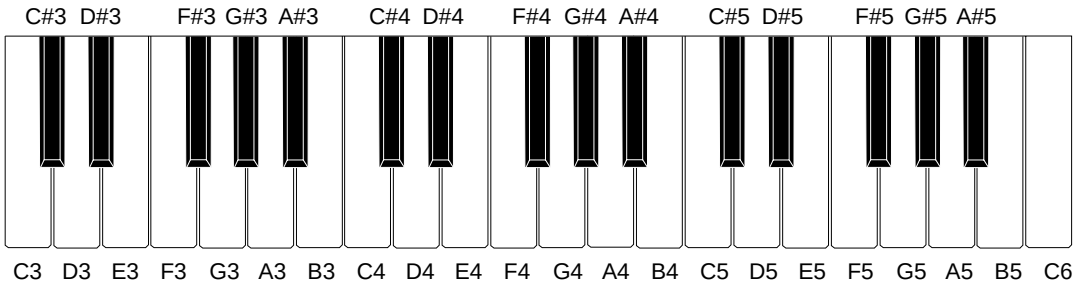
GENERAL

Keyboard:	37 keys, 3 octaves (mini-size)
Polyphony:	4 notes maximum
Tones:	100
Patterns:	30 (RHYTHM, FREE SESSION, FUNNY)
Song band:	10 tunes; melody off
Tuning:	Fixed; A4 = approx. 442 Hz
Speakers:	Two; 8.0cm (output: 0.5 W + 0.5 W)
Input terminals:	AC adaptor (7.5 V DC)
Power supply:	Two-way Five AA-size batteries Battery Life: Approximately six hours on R6P (SUM-3) manganese batteries AC Adaptor (AD-1)
Power consumption:	7.5 V ⎓ 2.3 W
Dimensions (HWD):	74 × 650 × 211 mm (2-15/16 × 25-5/8 × 8-5/16 inches)
Weight:	Approximately 1.6 kg (3.53 lbs) (without batteries)

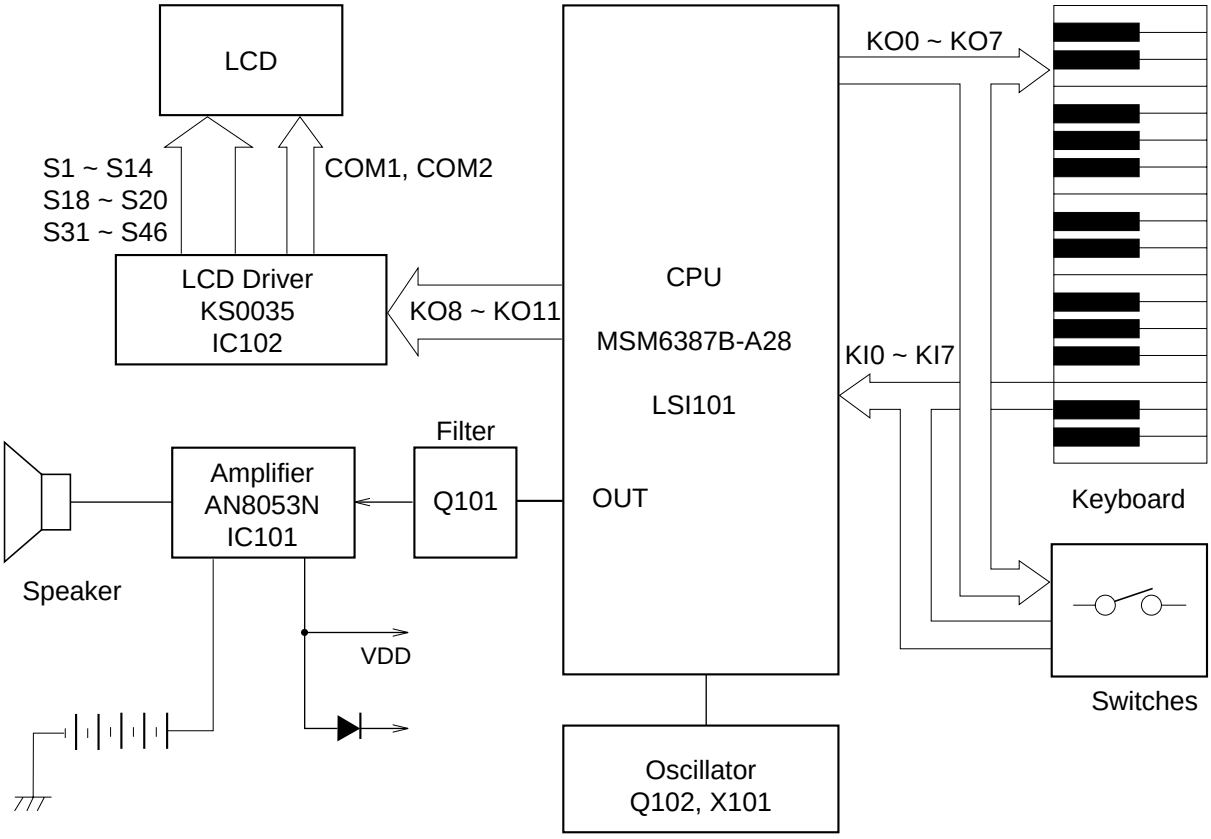
ELECTRICAL

Current drain with 7.5 V DC:	
No sound output	33 mA ± 20 %
Maximum volume with keys G3, A#3, B3 and C4 pressed in Car Horn tone, Volume: Maximum	230 mA ± 20 %
Speaker output level with key C2 pressed in Street Organ tone Volume: Maximum	1060 mV ± 20 %
Minimum operating voltage:	5.5 V

Nomenclature of Keys



BLOCK DIAGRAM



CIRCUIT DESCRIPTION

Key Matrix

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0				C3	C#3	D3	D#3	E3
KO1	F3	F#3	G3	G#3	A3	A#3	B3	C4
KO2	C#4	D4	D#4	E4	F4	F#4	G4	G#4
KO3	A4	A#4	B4	C5	C#5	D5	D#5	E5
KO4	F5	F#5	G5	G#5	A5	A#5	B5	C6
KO5	0	1	2	3	4	Tempo Up	Melody Off	
KO6	5	6	7	8	9	Volume Up	Tempo Down	
KO7	Song Bank	Pattern	Tone			Start/ Stop	Volume Down	

CPU (LSI101: MSM6387B-A28)

Containing a sound data ROM and a DAC (Digital to Analog Convertor), the CPU provides sound waveform in accodance with the pressed key and the selected tone.
The following table shows the pin functions of LSI101.

Pin No.	Terminal	In/Out	Function
1, 2	TEST1, TEST2	——	Not used. Connected to ground.
3	RESET	In	Power ON reset terminal. On: +5 V Off: 0 V
4	AVDD	In	+5 V source for the built-in DAC
5	OUT	Out	Sound waveform output
6	AGND	In	Ground (0 V) source for the built-in DAC
7	GND	In	Ground (0 V) source
8	COSI	In	21.725 MHz clock pulse input
9	COSO	——	Not used
10	VDD	In	+5 V source
11 ~ 18	KI0 ~ KI7	In	Input terminals from keys and switches
19	KO11	Out	Display data output
20	KO10	Out	Bit clock output
21	KO9	Out	Chip enable signal for the LCD driver
22	KO8	Out	Display blanking output
23 ~ 30	KO7 ~ KO0	Out	Key scan signal outputs

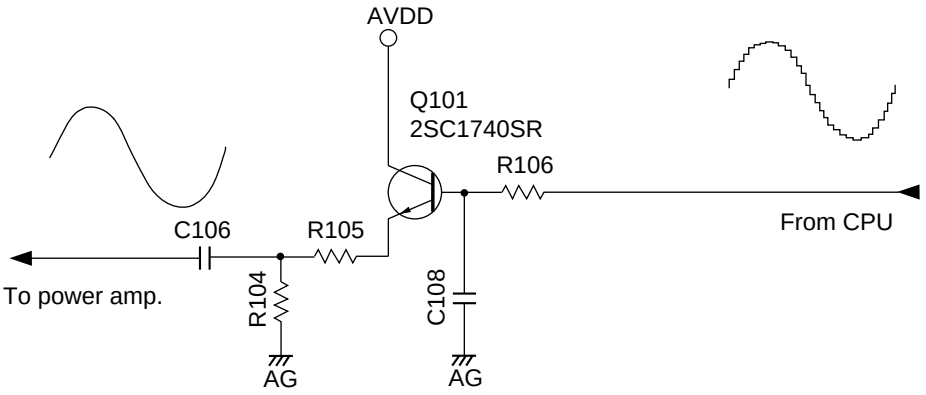
LCD Driver (IC102 : KS0035)

The KS0035 is an LCD driver for a segment type LCD, and it can drive up to 53 segments.
The following table shows the pin functions of IC102.

Pin No.	Terminal	In/Out	Function
1 ~ 14	S1 ~ S14	Out	Segment output
15 ~ 17	S15 ~ S17	——	Not used
18 ~ 20	S18 ~ S20	Out	Segment output
21 ~ 30	S21 ~ S29	——	Not used
31 ~ 47	S30 ~ S46	Out	Segment output
36	S35	——	Not used
48 ~ 54	S47 ~ S53	——	Not used
55	OSC	In	Terminal for the internal clock generator
56	VDD	In	+5 V source
57	–INH	In	Display blanking input
58	VLCD	In	+5 V source for the internal driver
59	VSS	In	Ground (0 V) source
60	CE	In	Chip enable input
61	CLK	In	Bit clock input
62	DATA	In	Display data input
63, 64	COM1, COM2	Out	Common out put

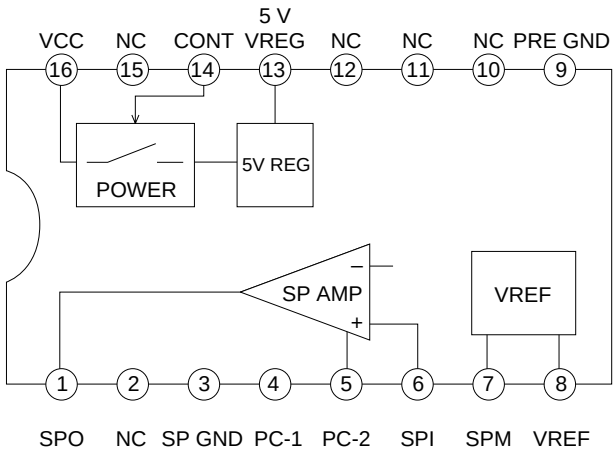
Filter Block

Since the sound signal from the CPU is a stepped waveform, the filter block is added to smooth the waveform.

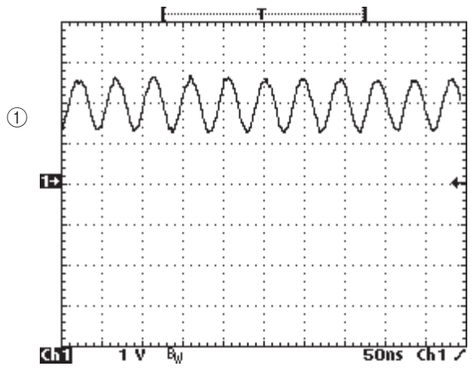


Amplifier/Voltage Regulator (IC101: AN8053N)

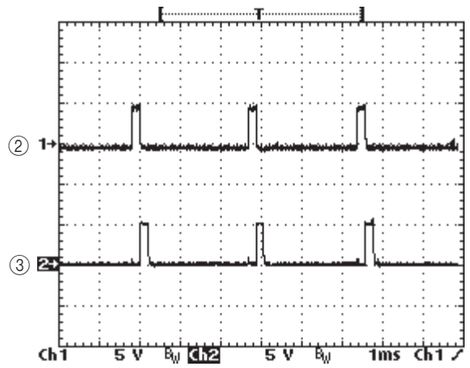
The right figure shows the internal block of IC101.



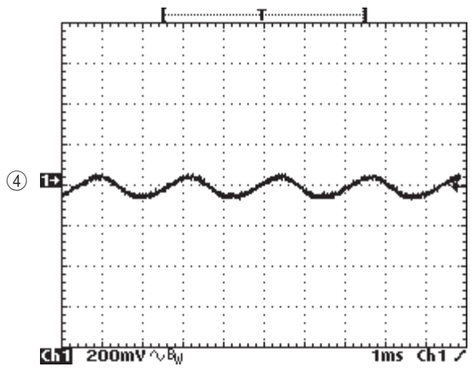
WAVEFORMS



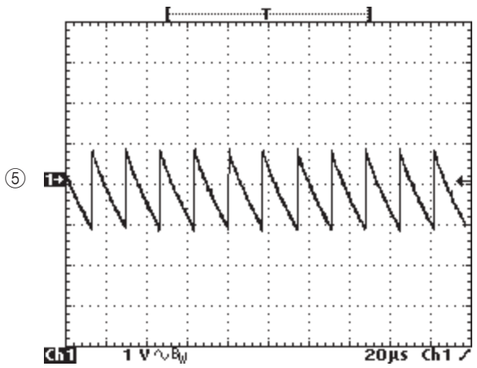
① Main clock COSI
MSM6387B-A28 pin 8



② Key scan signal KO0
MSM6387B-A28 pin 30
③ Key scan signal KO1
MSM6387B-A28 pin 29

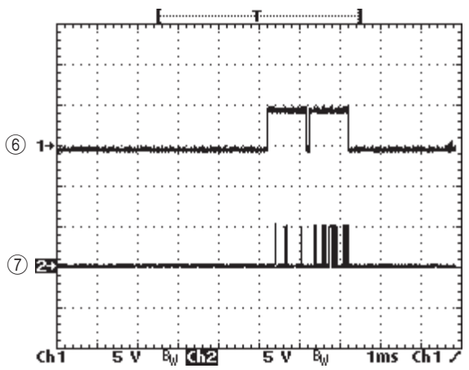


④ Sound waveform
MSM6387B-A28 pin 5

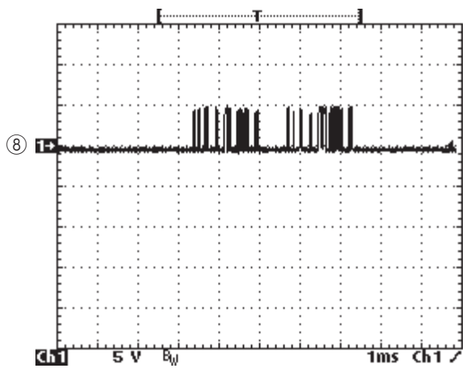


⑤ Clock for LCD driver
KS0035 pin 55

Tone : Flute (No. 23)
Volume : 5 (Max.)



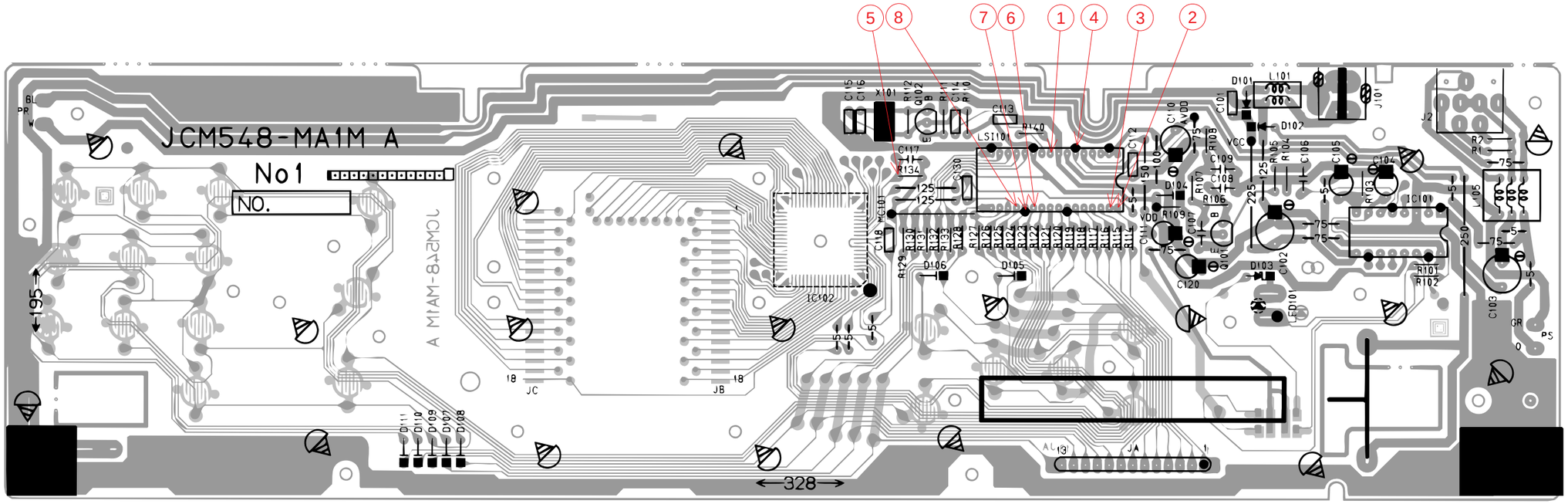
⑥ Chip enable signal KO9 (CE)
MSM 6387B-A28 pin 21
⑦ Clock for LCD driver KO10 (CLK)
MAM6387B-A28 pin 20



⑧ Display data KO11 (DATA)
MSM6387B-A28 pin 19

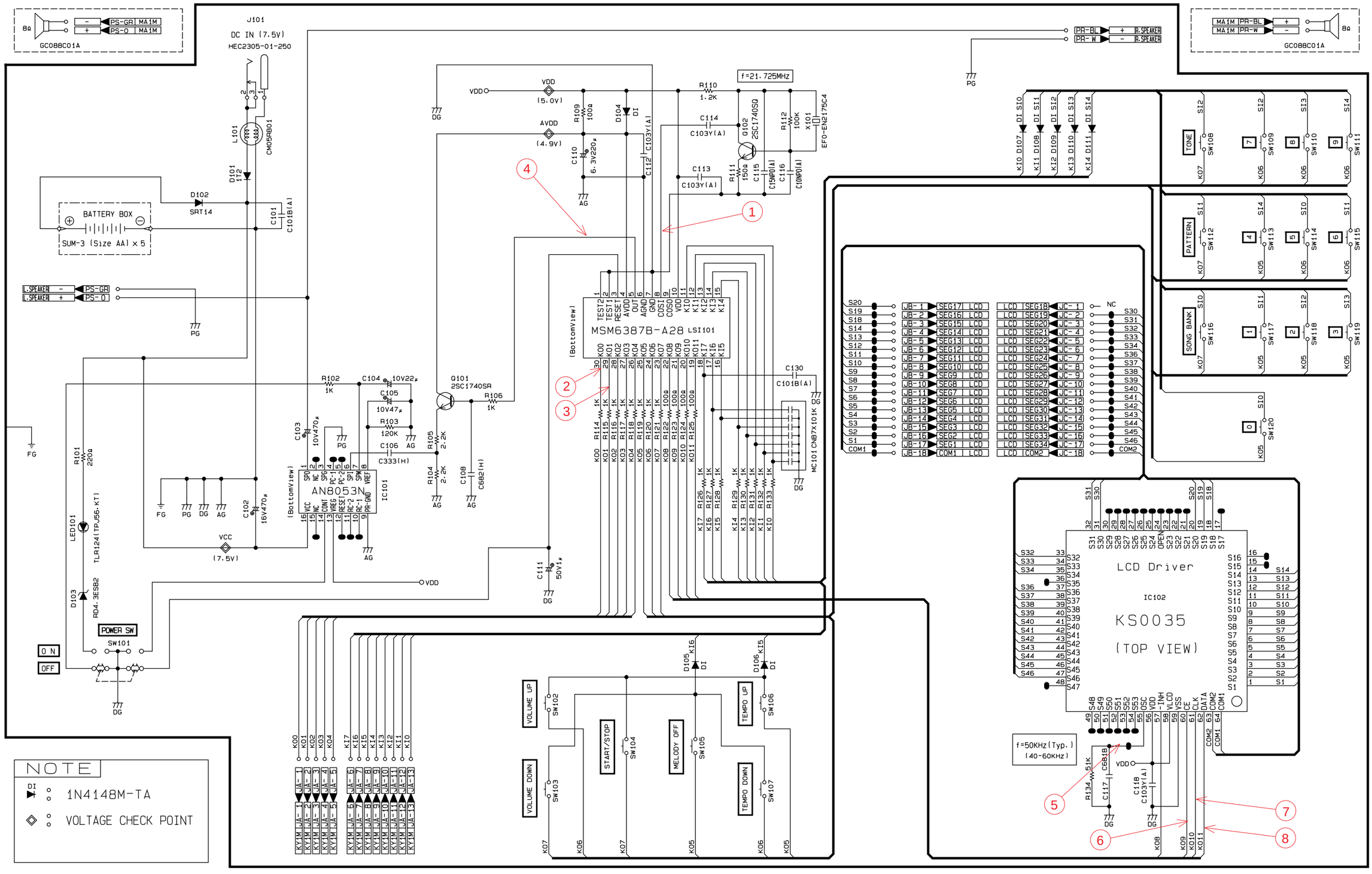
PRINTED CIRCUIT BOARD

Main PCB JCM548-MA1M



SCHEMATIC DIAGRAMS

Main PCB JCM548-MA1M

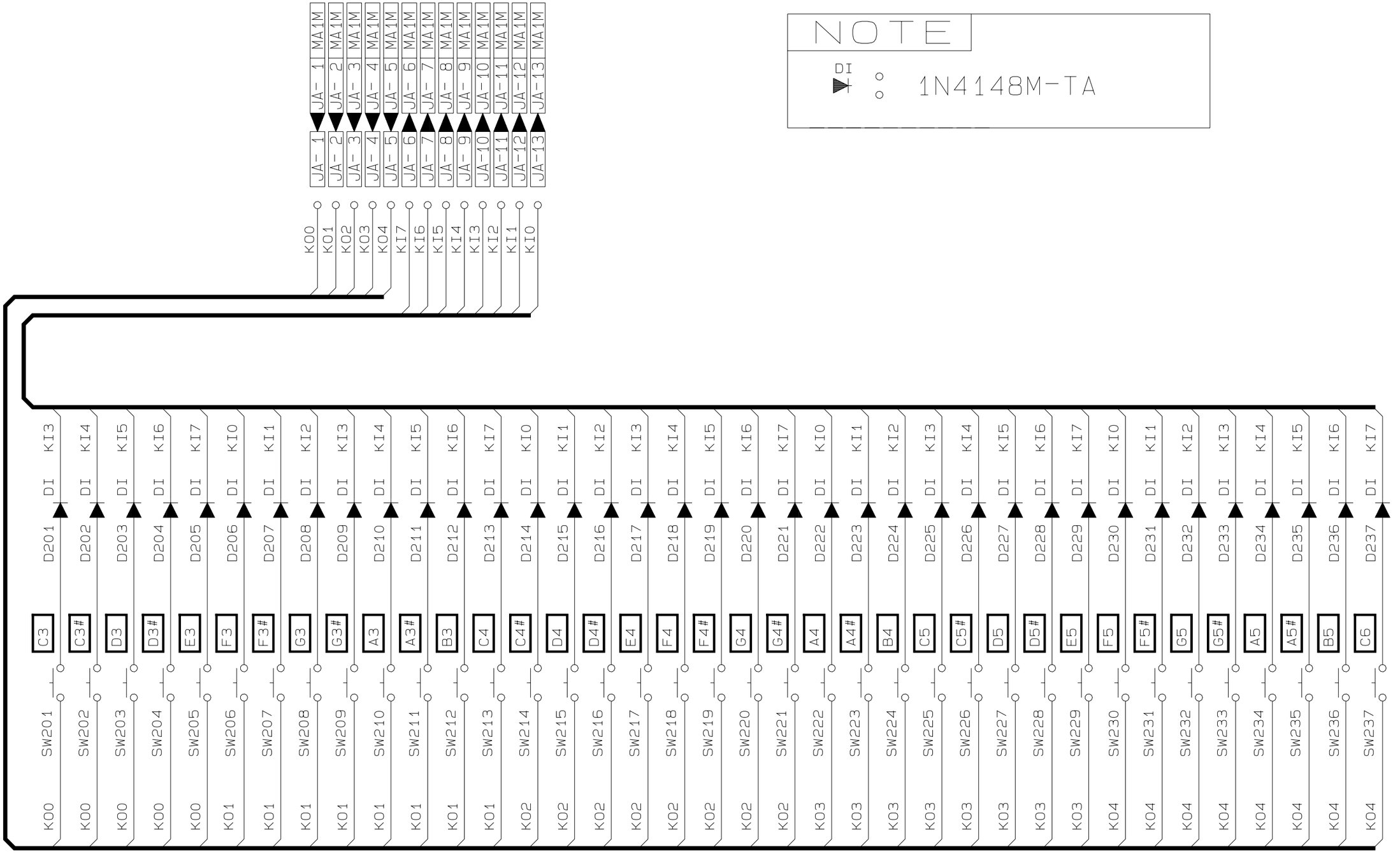


NOTE

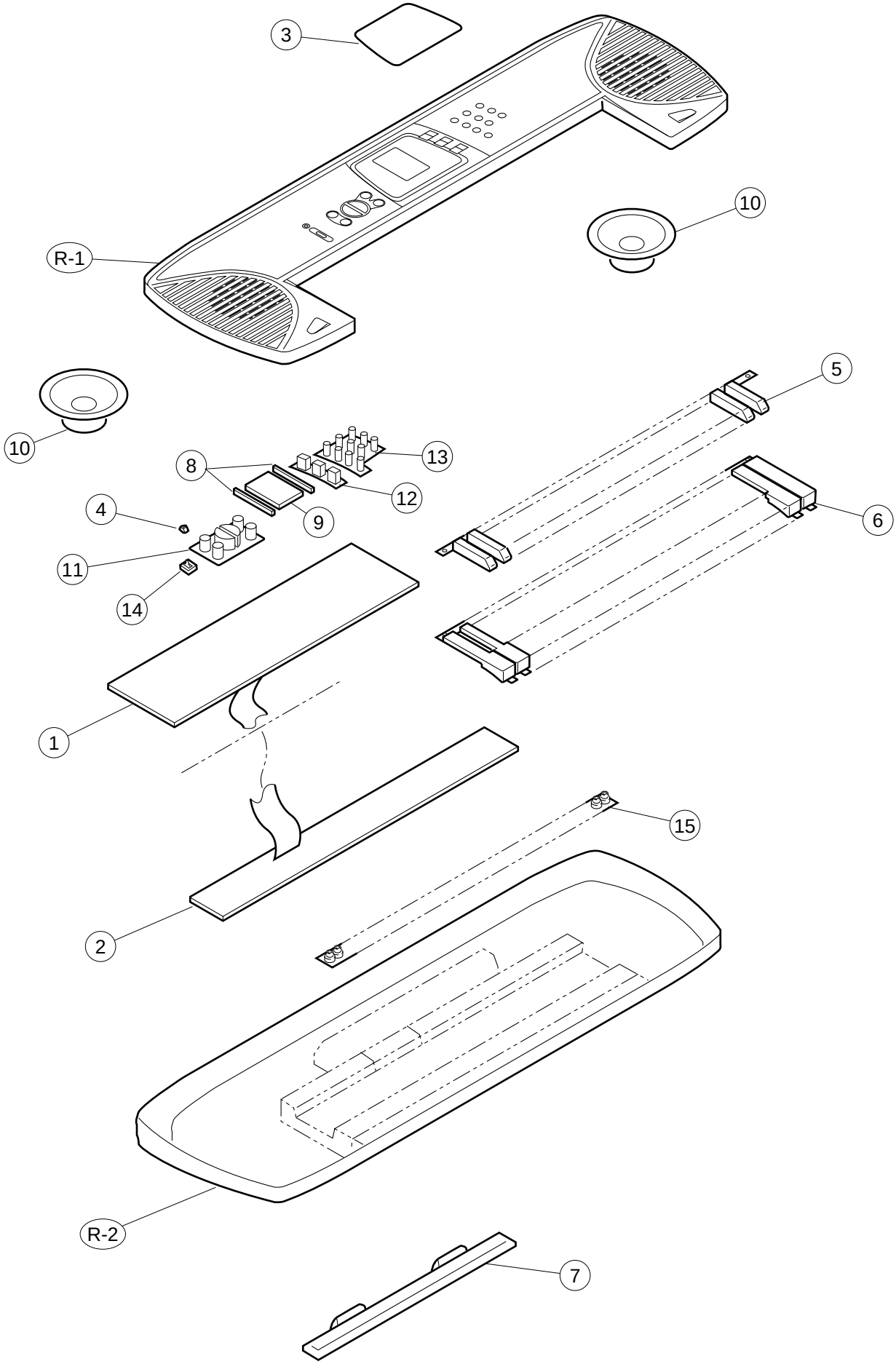
DI 1N4148M-TA

VOLTAGE CHECK POINT

Keyboard PCB JCM548-KY1M



EXPLODED VIEW



PARTS LIST

SA-65

Notes: This parts list does not include the cosmetic parts, which parts are marked with item No. "R-X" in the exploded view.
Contact our spare parts department if you need these parts for refurbish.

1. Prices and specifications are subject to change without prior notice.

2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published seperately.

3. The numbers in item column correspond to the same numbers in drawing.

Item	Code No.	Parts Name	Specification	Q	R
	Electrical Parts				
1	6926 1200	PCB/ASSY (MA1M)	M140578*1	1	B
LSI1	2012 5610	LSI/MC (CPU)	MSM6387B-A28	1	A
IC101	2114 3269	IC/LINEAR (AMP)	AN8053N	1	A
IC102	2114 5793	IC/MOS (LCD DRIVER)	KS0035	1	A
Q101	2220 1409	TRANSISTOR	2SC1740SR-TP-T	1	B
Q102	2220 1387	TRANSISTOR	2SC1740SQ-TP-T	1	B
D101	2390 3018	DIODE	1T2	1	B
D102	2390 1323	DIODE	RB100A-T32-T	1	B
D103	2310 7848	DIODE/ZENER	RD4.3ESB2-T1-T	1	B
D104-D111	2390 1344	DIODE	1SS133T-77-T	8	B
LED101	2370 1383	LED	TLR124(TPJ56,KT)	1	B
X101	2590 1897	OSCILLATOR/CERAMIC	EFO-EN2175C4	1	B
J101	3501 3731	JACK/POWER	HEC2305-01-250	1	A
2	6926 1230	PCB/ASSY (KY)	M140580*1	1	B
D201-D237	2390 1344	DIODE	1SS133T-77-T	37	B
	Mechanical Parts				
3	6926 1000	PANEL/DISPLAY	M340626-1	1	C
4	6921 5031	KNOB	M311856A-1	1	B
5	6926 1290	KEY SET/BLACK	M140541-1	1	A
6	6926 1280	KEY SET/WHITE	M140540-1	1	A
7	6926 1210	COVER/BATTERY	M340646*1	1	B
8	6926 1300	RUBBER/INTERCONNECTOR	M440442-2	2	B
9	3335 6569	LCD	CG161-TS(A)	1	B
10	3831 1076	SPEAKER	300RB326	2	B
11	6926 1030	RUBBER/BUTTON	M240595-1	1	B
12	6926 1020	RUBBER/BUTTON	M240596-1	1	B
13	6926 1010	RUBBER/BUTTON	M240597-1	1	B
14	6909 5890	SWITCH/SLIDE KONB	CSB-12D	1	B
15	6926 1040	RUBBER/CONTACT	M240594-1	1	B

Notes: Q – Quantity per unit
R – Rank

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